

REMARKS

Favorable reconsideration is respectfully requested in light of the following remarks, wherein Claims 1-3, 7 and 9 are amended, and new Claims 12-14 are added. Currently, Claims 1-14 are pending in the present application.

As an initial matter, Applicants express gratitude to Examiner Kong for the courtesies granted Applicants' attorney during the recent interview. During the interview, the rejection of Claims 1 and 4 under 35 U.S.C. §112, second paragraph, were discussed. The Examiner agreed that the amendments suggested by the Applicants would overcome the 112, second paragraph issues. Accordingly, withdrawal of the rejections based upon 35 U.S.C. §112, second paragraph, is respectfully requested.

Claims 1, 2, and 4-11 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,616,244 to *Hakkinen* in view of U.S. Patent No. 6,859,729 to *Breakfield et al.* Claim 3 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Hakkinen* in view of *Breakfield et al.*, and further in view of U.S. Patent No. 6,480,729 to *Kageyama*.

During the interview, Applicants presented arguments as to why the combined references would not teach the features of independent Claims 1 and 7. The Examiner indicated he would consider our arguments, after further detailed review of the references.

Independent Claim 1 recites a method of monitoring the location of a mining vehicle in a mine, the method comprising determining data on the location of at least one mining vehicle in the mine by at least one measuring device provided in the mining vehicle, transmitting the location data to a mine control system, employing the obtained location data in the mine control system for monitoring the operation of the mining vehicle, providing at least one first section and

at least one second section in the mine; providing at least one wireless network for the first mine section which communicates with the mine control system and includes at least one base station for establishing a data communication connection between the mining vehicle and the wireless network, the mining vehicle being in the coverage area of at least one base station in the first mine section, arranging at least one base station in the second mine section for establishing a data communication connection between the mining vehicle and the wireless network in the first mine section, determining the location of the mining vehicle in the first mine section by means of positioning performed in the wireless network on the basis of the location of the at least one base station in the first mine section, and determining the location of the mining vehicle in the second mine section by the at least one measuring device provided in the mining vehicle and transmitting the location data to the mine control system over the wireless network of the first mine section.

Independent Claim 7 recites a system for monitoring the location of a mining vehicle in a mine, the system comprising means for determining the location of the mining vehicle, a mine control system, at least one control unit arranged in the mining vehicle, at least one wireless network for data transmission between the control unit of the mining vehicle and the mine control system, at least one base station for creating a wireless network, and wherein, the mine comprises at least one first section provided with at least one wireless network, the mining vehicle being in the coverage area of at least one base station in the first mine section, the mine comprises at least one second section provided with at least one base station for establishing a data communication connection between the control unit of the mining vehicle and the mine control system, the location of the mining vehicle in the first mine section is arranged to be

determined using positioning performed in the wireless network on the basis of the location of the at least one base station in the first mine section, the location of the mining vehicle in the second mine section is arranged to be determined by at least one measuring device provided in the mining vehicle, and wherein location data are arranged to be transmitted in the second mine section over the wireless network of the first mine section from the mining vehicle to the mine control system. None of the art of record discloses these patentable features.

For example, *Hakkinen* relates to a system and method that uses a teleoperated measuring device, which is provided with measuring devices and is in wireless data connection to a control room of a mine (column 3, lines 24-50). The measuring device is provided with measuring means such as an inertial measuring device and an ultrasonic scanner for performing positioning. Thus, in *Hakkinen* the wireless data connection serves only for transmitting data and the positioning is performed by conventional measuring means. Accordingly, *Hakkinen* fails to disclose the features of (1) at least one base station positioned in the first mine section; (2) arranging at least one base station in the second mine section for establishing a data communication connection between the mining vehicle and the wireless network; and (3) determining the location of the mining vehicle in the first mine section by means of positioning performed in the wireless network. This is conceded by the Examiner on page 4 of the Official Action. The Examiner seeks to rely upon *Breakfield* for disclosing that which is missing from *Hakkinen*.

However, *Breakfield* relates to landmine clearing vehicles, which are navigated by means of GPS. Upon dropout of GPS (a navigation signal is lost), the vehicle is then navigated using another navigation system. One alternative is using a physical waypoint marker upon dropout of

GPS (column 2, lines 49-51). The Examiner refers also to the physical waypoint marker, the principle of which is shown in Figure 2.

In column 5, lines 44-46, it is disclosed that physical waypoint markers (114) are placed in known positions along a path (202) of the vehicles (204). In column 5, lines 50-63, it is further mentioned that the physical waypoint marker (114) includes a reflective detection member (208), which is detected through the use of machine vision arranged in the vehicles (204). In accordance with the system disclosed in *Breakfield*, the physical waypoint marker (114) is identified by machine vision and then the preset position information data of the detected waypoint marker is transmitted via radio transmission to the vehicle. Thereby, *Breakfield* only discloses sending previously filed positioning data. In *Breakfield*, the radio transmission serves only for data transfer (as in *Hakkinen*) of previously filed positioning data. As such, in *Breakfield*, the positions of the waypoint markers have no influence to the positioning data. In the present invention, the location of the mining vehicle is performed in the wireless network on the basis of the location of the at least one base station. As such, no physical markers in the mine and no machine vision in the vehicle are needed. Accordingly, *Breakfield* fails to disclose the feature of the at least one base station, as defined in independent Claims 1 and 7.

Moreover, the combination of *Hakkinen* and *Breakfield* would not have been obvious for one having ordinary skill in the art. *Hakkinen* teaches that no fixed infrastructure should be built into a mine for establishing positioning (See column 1, line 66 to column 2, line 1, and column 2, lines 40-42). *Breakfield* teaches to place a plurality of physical waypoint markers into the mine. Thus, *Breakfield* teaches into an opposite direction. As such, one having ordinary skill in the art would not look to *Breakfield* for modifying the teachings of *Hakkinen*.

According to the Examiner it would have been obvious to modify Hakkinen to arrange base stations for establishing wireless data communication between the mining vehicle and the network, taught by *Breakfield* to improve the determination of the location. However, if for some reason the teachings were combined, the end result would still not include all the features of the present independent claims 1 and 7. Neither of the two citations discloses or teaches performing positioning in the wireless network on the basis of the location of the at least one base station. In *Hakkinen*, the positioning is performed by inertial measuring device or ultrasonic scanner and in *Breakfield* by detecting the physical waypoint marker. In both of these documents, radio transmission system is used only for transmitting data.

With regard to dependent Claim 5, the Examiner states that it would have been obvious to combine the teaching disclosed in column 7, lines 23-56 of *Breakfield* with *Hakkinen* and to end up to the solution of claim 5. However, the referred text portion of *Breakfield* relates to improving the accuracy of the GPS positioning system based on satellite access, whereas *Hakkinen* relates positioning in underground mines (control marks in mine galleries) wherein satellite access is not possible. Therefore, it would not have been obvious to combine these references in the manner suggested by the Examiner.

With regard to dependent Claims 6 and 10, Applicants submit that it would be illogical to substitute the markings of *Hakkinen* with any base stations as suggested by the Examiner since *Hakkinen* teaches to avoid any infrastructure to be built into the mine. Further, *Breakfield* teaches placing a plurality of physical waypoint markers into a mine and not a plurality of base stations. Only in column 7 of , *Breakfield* it is mentioned the term "base station" in connection to GSP-positioning system. In lines 29-31 *Breakfield*, it is taught that one single "base station" can be

used. Moreover, *Breakfield* fails to provide any information as to where the base station is placed, i.e., it could be placed just outside the mine. Finally, there is no teaching in *Hakkinen* or *Breakfield* registering the visits of the mining vehicle to the coverage area of any base station. Accordingly, *Hakkinen* and *Breakfield* fail to disclose the patentable features of the present invention.

For at least the foregoing reasons, the method and system of independent Claims 1 and d7, and the claims depending therefrom, are patentably distinguishable over the applied documents. Accordingly, withdrawal of the rejections of record and allowance of this application are earnestly solicited.

Should any questions arise in connection with this application, or should the Examiner believe a telephone conference would be helpful in resolving any remaining issues pertaining to this application, it is respectfully requested that the undersigned be contacted at the number indicated below.

EXCEPT for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§ 1.16 and 1.17 which may be required,

including any required extension of time fees, or credit any overpayment to Deposit Account 50-0573. This paragraph is intended to be a CONSTRUCTIVE PETITION FOR EXTENSION OF TIME in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully Submitted,

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